

WHAT IS CLAIMED IS:

1. A neuronal device for modulating neuronal activity, said device comprising:
a housing having a surface biocompatible with at least a portion of a neuronal cell; an aperture in said surface; a reservoir connected to said aperture; and a flow regulator in operable relationship with fluid in said reservoir for moving said fluid to said aperture.
2. A device according to claim 1, wherein said flow regulator is an electromechanical device.
3. A device according to claim 1, wherein said flow regulator is an electrical device.
4. A device according to claim 1, wherein said surface is micropatterned for directing a neuronal process toward said aperture.
5. A device according to claim 1, wherein said aperture has a cross-sectional area in the range of about 0.75 to $15\mu\text{m}^2$.
6. A device according to claim 1, wherein said reservoir comprises a bioactive agent.
7. A neuronal device for modulating neuronal activity, said device comprising:
a housing having at least one aperture; a surface biocompatible with at least a portion of a neuronal cell and micropatterned for directing growth of a neuronal process to said aperture; a reservoir connected by a channel to each said aperture; and an electrically controlled flow regulator in operable relationship with fluid in said reservoir for moving said fluid to said aperture.
7. A device according to claim 7, wherein said micropattern comprises bioactive agents and directs growth of said neuronal process to said aperture.
8. A device according to claim 7, wherein said device is of a size to fit into a subretinal or epiretinal site.
9. A device according to claim 7, wherein said device comprises at least one photodiode.
10. A device according to claim 7, having a well in said surface, said aperture opening into said well.
11. A neuronal device for modulating neuronal activity, said device comprising:
a housing of a flexible material having a surface biocompatible with at least a portion of a neuronal cell; an aperture in said surface; a reservoir connected to said aperture; and a flow regulator in operable relationship with fluid in said reservoir for moving said fluid to said aperture.

12. A device according to claim 11, wherein said flexible material is a polysiloxane.
13. A device according to claim 11, wherein said device is comprised of two layers:
a first layer comprising at least one reservoir and at least one channel, each reservoir connected to a channel; and
a second layer covering said first layer enclosing said reservoir and channel and having an aperture in communication with said reservoir.
14. A device according to claim 13, wherein said second layer is micropatterned for directing growth of a neuronal process to said aperture.
15. A device according to claim 11, wherein said reservoir contains a bioactive agent.
16. A device according to claim 11, wherein said flow regulator is an electromechanical device.
17. A device according to claim 16, wherein said device comprises photodiodes and said electromechanical device is actuated by photodiodes.
18. A device according to claim 11, wherein said flow regulator is an electrical device.
19. A device according to claim 18, wherein said device comprises photodiodes and said electromechanical device is actuated by photodiodes.
20. A method for stimulating a neuronal cell, said method comprises:
inserting in proximity to a neuronal site a device according to claim 1, wherein said reservoir contains a bioactive agent.
21. A method according to claim 20, wherein said neuronal site is a retinal site.
22. A method according to claim 20, wherein said bioactive agent is a neurotransmitter.
22. A method for stimulating a neuronal cell, said method comprises:
inserting in proximity to a neuronal site a device according to claim 11, wherein said reservoir comprises a bioactive agent.
23. A neuronal device for modulating neuronal activity, said device comprising:
a housing having a surface biocompatible with at least a portion of a neuronal cell; an aperture in said surface; a reservoir connected to said aperture; and a flow regulator in operable relationship with fluid in said reservoir for moving said fluid to said aperture, wherein said neuronal device comprises at least one of a flexible housing, a flexible membrane pump or a light sensitive polymer flow regulator.